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Mathematical and Physical Analysis of a Violin Note Using Computational Simulations.

The amplitude of the sound as a function of time is well displayed on a spectrum, an ordered array of the components. We used such time spectrums to slice out the files or certain parts of a music note. In this paper, mathematical and physical knowledge were used to perform the spectral analysis of Violin. First, the wave forms and spectrums of Violin were obtained and they were compared to other instruments. Compared to Violin, it was interesting to see that several instruments, such as brass instruments have much more energy in their second, third, and/or third harmonics than in the first frequency. Most of them generate a fuzzy tone. Also, Compared to Violin, the flute shows the purest tones until 1000 Hz and most fuzzy mode after the 1000Hz. The brass and woodwind instruments show most of their energy in the second and third harmonics rather than the first frequency. Specifically, the string instrument such as Violin shows strong first and third harmonic components. Finally, psychoacoustics that includes various topics are studied how it is relevant to music psychology and music therapy. (Received March 03, 2020)